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SMART POWER OPTIMIZER IN PEAK SHIFT

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Smart Power Optimizer in Peak Shift

Problem:

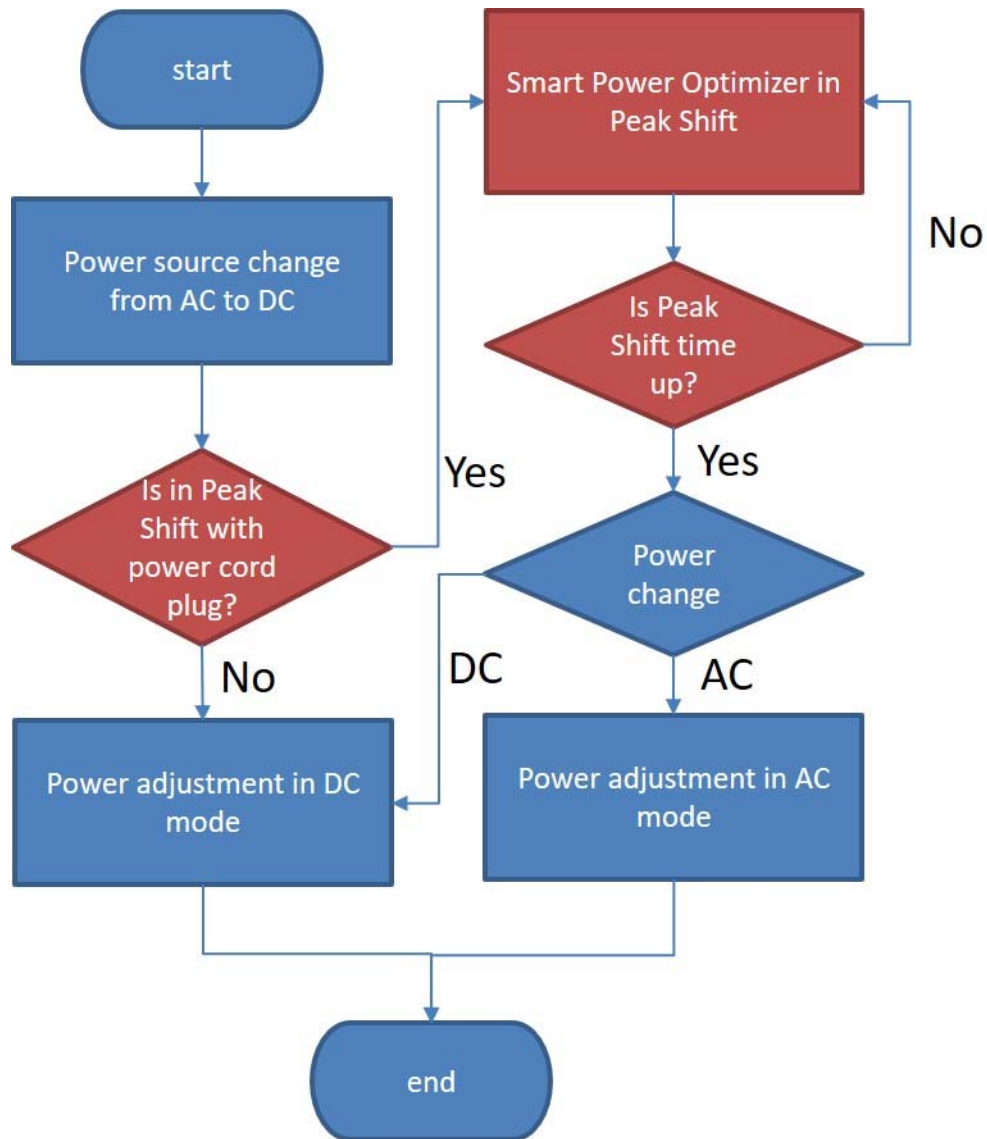
Peak Shift is a management regarding reduce power plant loading. In Peak Shift, system enforce to be in DC mode. System power adjustment in DC mode is reducing for battery life consideration. Thus, users may get bad experience with system performance dropping in Peak Shift. We design a smart power optimizer in Peak Shift, which system get better performance as closer as system in AC mode, which system get good battery protection to avoid battery damage by system producing power peak in better performance.

Objectives:

- Users get better experience in Peak Shift because system keep the better performance as closer as system in AC mode.
- Battery get good protection because the power control to avoid battery damage by power peak.

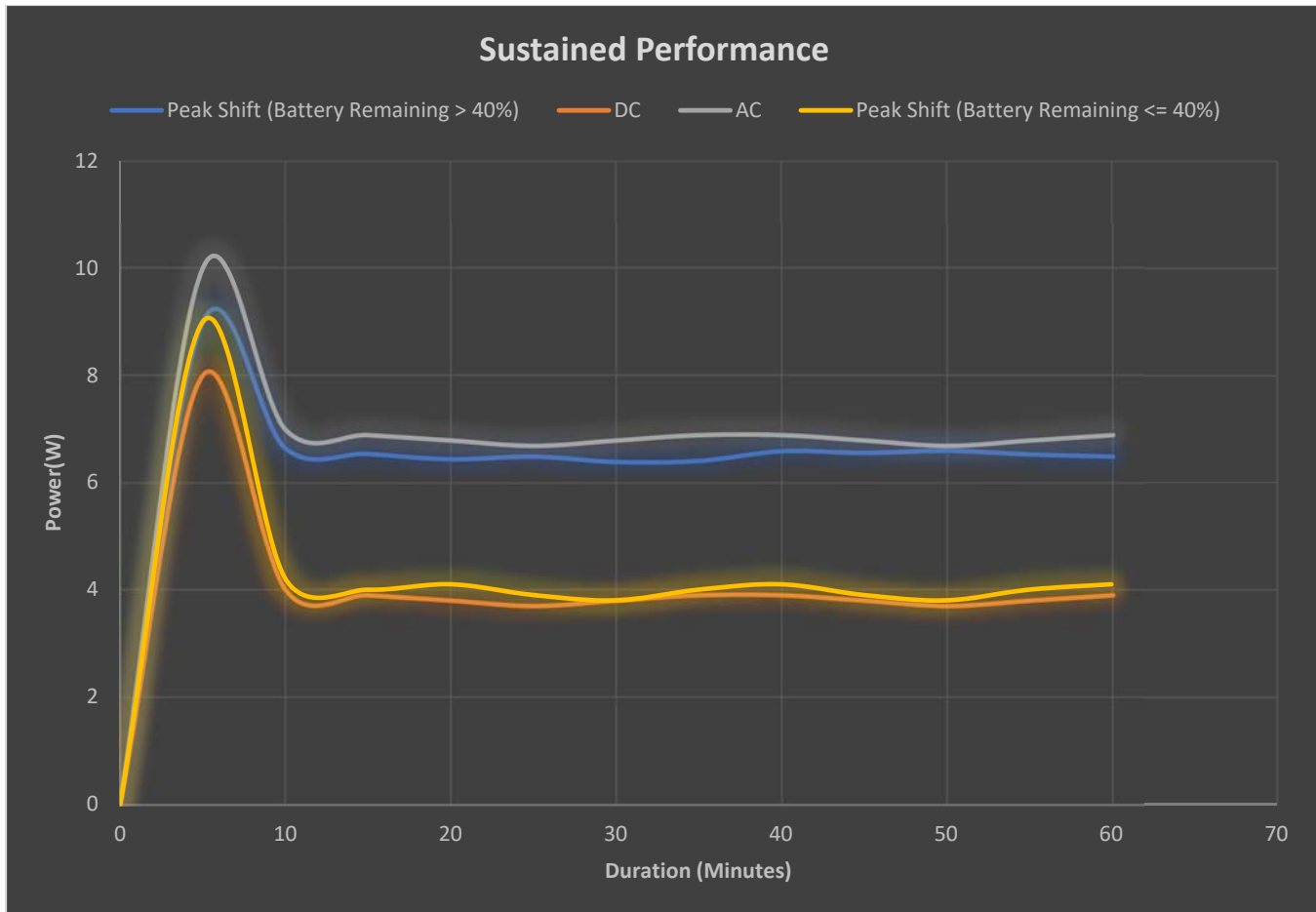
Solution:

- ***Original flow (not including red parts)***
 1. System detect power source changes form AC mode to DC mode and change directly power adjustment in DC mode
 2. System change the power adjustment in AC mode or in DC mode until power source changes.
- ***Advanced flow (including red parts)***
 1. System detect power source change form AC mode to DC mode and system want to enter Peak Shift with power cord plugged in.
 2. System executes smart power optimizer in Peak Shift according to battery remaining, system power usage, Peak Shift duration, or etc.
 3. System change to AC mode or DC mode when Peak Shift time up.



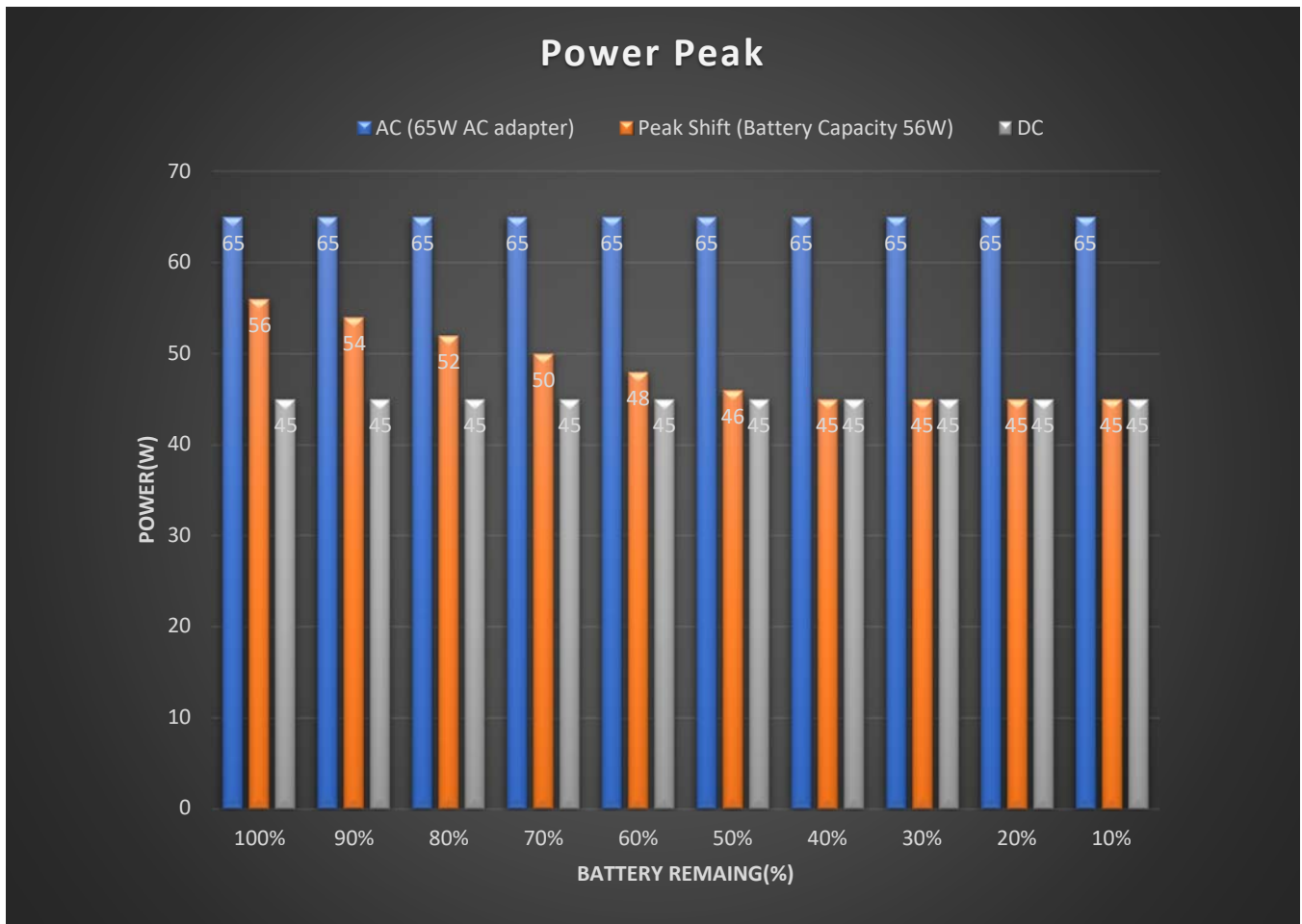
The consideration of sustained power in Peak Shift:

- 95% of sustained power in AC mode if Battery remaining > 40%.
- 105% of sustained performance in DC mode if Battery remaining <= 40%



The consideration of power peak protect in Peak Shift.

- Power limit 4(PL4, power could allow peak for up to 10ms) set as Battery capacity
- According to battery remaining to down the PL4 as 2W stepping.
- Setting PL4 in DC mode if Battery remaining $\leq 40\%$
- Assuming the AC adapter is 65W and battery design capacity is 56W, the allowable power peak in AC mode may design as 65W, and the allowable power peak in DC mode may design to 45W for battery life consideration. In Peak Shift, it may allow more power peak when battery remaining $> 50\%$.



Disclosed by Daniel Chung, Sharon Wei, Eric Huang and Tom Hung, HP Inc.